NATIONAL AERONAUTICS AND SPACE ADMINISTRATION
1520 H STREET NORTHWEST
WASHINGTON 25, D. C.

June 9, 1959

In reply refer to: BID

New Mailing Lists For
NASA Technical Publications

NASA is adopting a new group of subject categories (NASA Form 438, enclosed) that will be used to distribute technical publications. Completely new mailing lists are now being prepared. In order that NASA publications may be distributed effectively, your current needs for them must be established.

To date, NASA technical publications have been distributed to the mailing lists based on the NACA distribution categories. All addressees on those lists, including those who have been added during the past six months, must now indicate a current need for NASA publications, in order to be placed on the new NASA technical publications mailing lists.

Please examine the name and address imprinted in block (7) of the enclosed NASA Form 439.

(a) If NASA technical publications are to be sent to that addressee, make any necessary corrections to the imprinted address, and complete Form 439.
(b) If NASA technical publications are not to be sent to that addressee, please write "Obsolete" in block (7) and return the form to NASA. This action will help us clear our old mailing lists.

(c) If you qualify for security-classified publications and wish to receive them, fill out block (1) of NASA Form 440, enclosed. (Although other persons at your facility may request registration on NASA publications mailing lists, NASA will need only one certification of the facility clearance. We therefore suggest that you submit the Form 440 through your facility security office, which can filter out redundant requests for certification.)

Instructions for executing and submitting the forms are given on the reverse side of the forms.

Please return the forms to NASA at your earliest convenience. Prompt action will ensure that you will receive all NASA publications that you need. If you no longer need NASA publications, an early statement to that effect will be a service to us. If you do not submit NASA Form 439 to us, we will conclude that you do not wish to receive NASA technical publications. If you do not submit NASA Form 440, we will conclude that you have no need for security-classified publications.

BA Mulcahy

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Bertram A. Mulcahy
Director of Technical Information

Enclosures

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION

WASHINGTON 25, D. C.

NASA RELEASE NO. 59-161
EX 3-3260
Ext. 6325

FOR IMMEDIATE RELEASE
June 10, 1959

Released jointly by DOD and NASA

NASA WILL USE DOD'S INDUSTRIAL SECURITY SERVICES

An agreement between the Department of Defense and the National Aeronautics and Space Administration, making available DOD's Industrial Security Program to the NASA, has eliminated the need for the civilian space agency to establish a similar program. The agreement, authorizing DOD to act on behalf of the NASA in security matters relating to contractors, was reached yesterday by an exchange of letters between Thomas S. Gates, Deputy Secretary of Defense, and T. Keith Glennan, NASA Administrator.

Under terms of the agreement, the Department of Defense will issue security clearances to employes of NASA contractors and will inspect contractor facilities and operations. The arrangement applies both to contracts administered by one of the military departments for NASA and those administered solely by NASA.

Here is how DOD's Industrial Security Program will be applied to NASA projects:

1. The military services having security cognizance over a contractor's facility would provide security services on an NASA

classified contract at that facility.

2. If a proposed NASA contractor is not already "cleared," DOD will take the necessary steps at NASA request and one of the military services will be authorized to handle security matters.

3. NASA will adopt the existing DOD regulations relating to industrial security and NASA contracts will contain a clause to this effect. The civilian space agency will have a voice in future revisions of these regulations.

4. A voting NASA representative will sit on DOD boards considering clearance for access to an NASA contract.

- END -

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION

WASHINGTON 25, D. C.

NASA RELEASE NO. 59-162
EX 3-3260
Ext. 6326

FOR RELEASE:
Thursday, AM
June 11, 1959

NASA FORMS COMMITTEE ON AN EQUATORIAL RANGE

A committee to study need for and the technical feasibility of an equatorial launching site has been formed under the auspices of the National Aeronautics and Space Administration. Designated the Committee on an Equatorial Range, the group will advise the NASA Administator regarding the technical aspects of the question.

If the committee decides on a technical basis that an equatorial site is in the national interest, other studies on site location, size of facility, instrumentation, and construction schedules will then be initiated.

Dr. Hagen, NASA's Assistant Director for Program Coordination in the Office of Space Flight Development, is chairman of the Committee. Other members are: James Goodwyn, Advanced Research Projects Division, Institute for Defense Analyses; H. H. Koelle, Chief of Future Projects Design Branch, Structures and Mechanics Laboratory, Army Ballistic Missile Agency; Wolfgang E. Moeckel, Chief of Advanced Propulsion Division, Lewis Research Center, NASA; Louis N. Rowell, Electronics Department, Rand Corporation, Santa Monica, California; Joseph W. Siry, Chief of Theory and Analysis Staff in Office of Tracking and Data Systems, Goddard Space Flight Center, NASA; Homer J. Stewart, Director of Program Planning and Evaluation, NASA; Allen E. Wolfe, Staff Engineer, Jet Propulsion Laboratory, Pasadena, California.

The committee held its first meeting June 3. Another meeting is scheduled in about six weeks.

- END -

FOR RELEASE
Tuesday, June 16, 1959
1:00 p.m.

Address by Richard E. Horner
Associate Administrator
National Aeronautics and Space Administration
to the
Second Annual Industry Missile and Space Conference
Detroit, Michigan, June 16, 1959

Mr. Toastmaster, Distinguished Guests, Ladies and Gentlemen:

May I first express my sincere appreciation for this opportunity to meet with you and participate in a conference which treats with subjects of such vital interest to all of us. The Michigan Aeronautics and Space Association, together with their co-sponsors, are to be congratulated for this public service in providing for this the Second Annual Industry Missile and Space Conference. It is apparent from the distinguished men of American industry that I have seen in attendance here that this opportunity to exchange ideas on topics of national importance is well appreciated. The officers who have spent freely of their valuable time in providing the excellent arrangements must feel great satisfaction in a job well done and a job well worth while. I can think of few audiences with which I would rather discuss the plans and programs of the National Aeronautics and Space Administration, and one could hardly imagine a more appropriate locale for this discussion than in the heart of one of America's most important industrial areas.

Mr. Duffy was kind enough to prepare you by explaining that the tenure of my office with the Administration was measured in days. It would seem therefore that I might have some license to talk with you from the point of view of a neophyte in the space business and utilize all of our time by looking ahead toward the wondrous future, with little or no attention to our past performance and present position. I am afraid, however, that I cannot claim to be completely uninitiated since I was intimately involved with many elements of the nation's space program in my former capacity with the Air Force. In fact, on many of the days of the last two weeks I have found myself pausing occasionally to remind myself that I had changed jobs. The problems, the people, and the press of time are much the same, and I find that my personal situation is not too different from that of the entire National Aeronautics and Space Administration, for this is a new organization, created and brought into existence with a program which in many of its elements was already well advanced. In effect, it was designed to fall into place in our government and hit the ground running at full speed. This is not an easy accomplishment. There have undoubtedly been mistakes made, and we will undoubtedly make additional mistakes before a wholly satisfactory level of operational efficiency is attained. On the other hand, there have been very significant advancements in the first eight months of the Administration's existence. From the very sizable nucleus provided by the National Advisory Committee for Aeronautics and its laboratories and the augmentation provided by important elements of the Department of Defense, notably the Vanguard team of the Naval Research

Laboratories, a broad comprehensive organization has been formed which has added the major function of space exploration to the former tasks of aeronautical research and development. A start has been made on the construction of the Goddard Space Development Center, at Beltsville, Maryland, and new facilities are being added at development sites which are already familiar names on the map of space development--names such as Wallops Island, Cape Canaveral, Edwards Air Force Base, and the Jet Propulsion Laboratory at Cal Tech. Other accomplishments have been more in the public eye and for the most part have been carried off with the cooperation and substantial assistance of other government agencies. Many of the space activities which have culminated in actual experiments during the last eight months have been transferred to NASA responsibility from a beginning in the Defense Department. In most of these cases the continued support of the Defense Department is essential to successful completion; thus we do not wish to give the appearance of claiming unwarranted credit, but the responsibilities of such projects are absorbing an increasing fraction of our resources, and it might be worth while to mention some of the more important evidences of progress as a review of the past eight months.

Three space probes have been substantially successful in transmitting to us invaluable information concerning the environment of space. Perhaps one of the most important results from the information radioed back from these vehicles was the confirmation of a fact that we have all suspected to be true. That is, that the very vastness of space will dictate a requirement for a vast number of future measurements, study, correlation, and analysis before we approach a satisfactory understanding of even that volume of space which is characterized by the lunar distance dimension.

One of the space probes, Pioneer IV, attained a sufficient velocity to leave the dominating influence of the earth's gravitational field. It passed within a few thousand miles of the moon and went on to enter a solar orbit. It was tracked in its flight for a distance almost twice that from the earth to the moon. And here again a measure of some of the tasks before us is provided by noting that although this is the greatest distance any man-made device has been followed by instruments to date, it is a distance which is almost infinitesimal by comparison to the needs of future space exploration.

The Vanguard II satellite was launched with equipment to sense, record, and transmit a coarse-grained picture of the earth's cloud cover. It was sent into orbit last February as the first of a series of space experiments designed to bring us practical data to improve the understanding of climatology. Unfortunately, the payload stage of the rocket did not stabilize as planned, making it extremely difficult to synthesize the cloud maps from the data provided. But the experience of sensing gradations of light reflection, recording and data transmission has been valuable and will provide an expectation of greater success in future experiments.

Another recent accomplishment characterizes the dual role assigned to NASA in promoting experimentation in both aeronautics and astronautics. The X-15 might be described as a hybrid creation which is equally at home in space outside and within the earth's atmosphere.

It is a rocket-powered research airplane. The performance of its propulsion unit is designed to boost it along a ballistic trajectory above the earth's sensible atmosphere, controlled in attitude such that, upon re-entry, it utilizes the lifting force of its aerodynamic surfaces to adjust the re-entry angle, extend its gliding range, and give the pilot some option in selecting his point of touchdown. As you probably know, in order to optimize performance for the size of craft involved, a scheme is used which involves carrying the research craft to a launch altitude of approximately forty thousand feet under the wing of a B-52. After a series of captive test flights to test the auxiliary systems, it was dropped from the B-52 last week for the first experience in free flight. The flight was exceptionally successful. All of the operating characteristics proved to be almost exactly as predicted. The degree of success permits us to proceed now with considerable confidence to the first powered flights, which will be of modest performance and intended primarily to develop reliability and confidence in the vehicle before it is taken to the extremes of its flight spectrum. The X-15 also falls into the category of jointly sponsored projects between the Department of Defense and NASA.

One of the major undertakings of the Administration and perhaps the most comprehensive in terms of resource needs, public interest, and the ultimate importance of final performance is the project of launching a manned satellite. Many elements of this project are already well advanced. An extremely careful selection process was undertaken to identify seven Astronauts, one of whom will be the first pilot of a

Project Mercury satellite. These young men are now undergoing an intensive training program and participating in the development of the hardware on which the success of the project will depend. The space capsule in which the Astronauts will ride is under active development, and full-scale models have been tested in aircraft drops and under static conditions. Not the least of the many important aspects of Project Mercury is the human engineering or bioscience area. Communications, capsule environment, attitude control, boost and re-entry limitations, emergency procedures--almost every aspect of the project impinges on the human engineering problem. Thousands of experiments are necessary to assure the safety and well-being of the Astronaut. One of these experiments attracted public interest when, about three weeks ago, two monkeys were sent more than three hundred miles into space as a biological experiment to produce necessary data. The data obtained were very heartening, and despite the unfortunate demise of one of the subjects during a relatively simple surgical procedure after the recovery, a real advancement has been achieved in dispersing some of the uncertainties concerning the effects of cosmic radiation, weightlessness, and re-entry deceleration.

So much for examples of recent accomplishments in our national space program. Before we proceed to a discussion of where we are going from here, it might be pertinent to ask the question--Why space experimentation? Certainly one answer to that question is embodied in the needs of our national defense. Whether we care to admit it or not, many of our early activities in space have been in response to the rather spectacular achievement of the Soviet Union. I do not mean to infer that such response was not due and proper. We have demonstrated time and again in this country that we perform most effectively in a time of crisis. Fortunately, when we were faced with the loss of national prestige through the performance of the early Russian Sputniks, we did have in advance stages of development the elements necessary from which we could build significant space accomplishments. Some of them I have already mentioned. In the long term, however, we must recognize that many of the further advancements that we seek will come only after months and years of well-planned and integrated work by highly specialized people and facilities. If such planning is to be timely and result in a well-ordered program which minimizes waste and maximizes accomplishment, we must look further for the answer of-- Why a space program? It may be useful to review for a minute some of the thinking that went into the present legislation which authorizes and directs our space activities. Certainly one of the key tenets of our national policy has been expressed several times--in the President's Report to the Congress requesting the establishment of a space agency, in the Conference Report of the Congress in the formulation of the legislation, and in the National Aeronautics and Space Act of 1958 as it was passed by the Congress and signed into law by the President. Let me quote from the Law, and specifically from the section entitled "Declaration of Policy and Purpose." I quote: "The Congress hereby declares that it is the policy of the United States that activities in space should be devoted to peaceful purposes for the benefit of all mankind." Now if this statement of policy is taken alone and out of context, it is somewhat misleading in that it avoids the question of even the current use of space as a medium of transit for instruments of national defense. The interrelationship between our national desire to commit our activities in space for peaceful purposes and the necessity of our defense needs in this troubled world is recognized by the Law in declaring that "such activities shall be the responsibility of, and shall be directed by, a civilian agency exercising control over aeronautical and space activities sponsored by the United States, except that activities peculiar to or primarily associated with the development of weapons systems, military operations, or the defense of the United States (including the research and development necessary to make effective provision for the defense of the United States) shall be the responsibility of, and shall be directed by, the Department of Defense." In this manner, you see, there is established the framework for joint and cooperative programs, with the National Aeronautics and Space Administration and the Department of Defense each contributing in the areas for which they are best qualified. In one sense one might say that this circumstance of an apparent conflict between our national motivations and our assessment of practical national needs poses a continuing problem in the program formulation process. The legislators, in the process of writing the Law, recognizing this uncertainty as well as the many uncertainties imposed by technical problems, cast the statute in general enough terms as to permit adequate latitude for interpretive application to the day-to-day needs.

The question of whether our national program is dominated by the needs of defense or devoted to peaceful purposes is treated in a slightly different way in the Report of the Senate Committee on Space and Astronautics in submitting the bill for Senate consideration. It emphasizes that regardless of the motivating force involved, it is essential that the nation get on with a program of establishing the technological base and a space capability. This thought can hardly be expressed better than in the words of the Report: "We may, as some say, stand now at the edge of the battleground for Armageddon, or we may, as others believe, be poised before the plane to the millennium. In either event, we have no national option but to marshal our resources, order our course, and proceed beyond the shelter and sanctuary of earth's atmosphere into this realm of the limitless unknown. To proceed prudently or to proceed at all, we must of necessity proceed by faith. Humility is a proper traveling companion for this national journey." And it is indeed this process of "marshaling our resources and ordering our course" which has been very much the concern of NASA during its first months of operation. The problem is not made simpler by the staggering number of possibilities of fruitful and worthwhile experiments that could be conducted on the grand scale of infinite space. One of the facts of life that must be understood as a prerequisite to ordering a national program is that the advances in science and technology of the past few years have created an environment such that space experiments that might be undertaken are limited only by our imagination, our pocketbooks, and time. Since there is little evidence that our imagination constitutes a significant containment, and since there is a direct relationship between the time required to obtain most of our objectives and the rate of resource investment, the supremely difficult question to answer can be simply stated as "What should the magnitude of our national space experimentation program be as measured in dollars?" Of course one cannot sensibly attempt an answer to that question without looking in some detail at the possible accomplishments. A measure of the resulting benefits that might accrue to mankind, the possibilities of regeneration of national wealth, the needs of national defense, and reflections on national prestige are a few of the many factors of extremely complex and interrelated considerations necessary to a final determination of program level which, at best, is probably always controversial. We in the business of forming the space program are likewise not unaware of the widely held opinion that space, because of its glamour, notoriety, and intimate relationship with national defense, is an area of research which might be oversubscribed in comparison with other areas, such as medical research or research into better control of our natural resources--areas which might offer great promise for real benefits to our people.

So with this background let's look for a moment at a few of the possibilities that are being considered as components for our national space program.

The development of manned space vehicle technology figures large in our present program and is almost certain to occupy an important place in any future program. Project Mercury, with its relatively limited objective of demonstrating the orbiting and recovery of a manned capsule is, in terms of the technical problems to be solved and the technical disciplines involved, a project of very substantial scope. Now it may seem to many of you that I am overly modest in describing a project which entails transporting a man around the world in approximately one and one-half hours as one with limited objectives. I certainly don't want to leave the impression that I am belittling the task involved, but on the other hand it is virtually certain that subsequent accomplishments will in fact place our first faltering steps in their proper context; and we must lay plans for more advanced work. The possibilities are numerous, and among the more attractive are included the provision of controls for selection of orbital paths and re-entry locations. It is obviously going to be one of the desires of the pilot to exercise his own discretion within the limits of the energy that can be provided to him in selecting where he goes and at what point he will end his journey. This desire immediately raises the question, of course, as to the form of sustaining propulsion that can be provided to the vehicle and also the aerodynamic shape that will be used for possible maneuvering when the vehicle returns to the earth's atmosphere. It will also be necessary to provide for many other functions in a manned vehicle. To capitalize on the unique capabilities provided by the presence of man, it is certainly possible that orbital laboratories will be established to carry out experiments in space that can be readily accomplished in no other way. Analytical studies can be produced to show that a permanent orbital laboratory is economical, with resupply and restaffing effected as dictated by the experimental needs. Thus arises the necessity of perfecting rendezvous techniques and gear which would permit the transfer of materiel and individuals from one vehicle to another. It may also develop that it would be ultimately desirable to have in orbit a laboratory of such magnitude and complexity as to make it impractical to launch it from the ground in one piece. Thus, assembling a laboratory in space becomes a function, which in itself, might be better accomplished by human hands than by automation.

A further extension of man's activities in space might very well go toward deeper space exploration. Of course there is a great deal of prerequisite effort in the form of unmanned experimentation and manned observation before we can think in terms of manned exploratory expeditions on the moon. The amount of such preliminary work, and therefore to some extent the time period necessary to complete it, is to a large extent dependent upon an assessment of the risks that are acceptable for the first attempt. We are currently approaching our man-in-space developments on the basis of sparing no effort to make them as safe as is realistically possible in view of the hostile environment in which we are working. Past experience will indicate, however, that as we become more familiar with the environment, we will quite naturally vary our evaluation of risk acceptability and, in fact, the magnitude of the actual risk undertaken. I can cite, for example, the fact that scarcely ten years ago supersonic flight in the atmosphere was approached in each instance with a great deal of preparation and with considerable uncertainty. Today we are engaged in the development of aircraft weighing hundreds of tons which are intended to fly several times the speed of sound, and there is considerable study toward the objective of providing supersonic transport service for anyone desiring to buy a ticket. I have no doubt that our attitudes towards manned flight in space will go through a parallel metamorphosis. After the manned explorations of the moon, we must consider expeditions to other planets of the solar system, with the attractions of Venus and Mars as those planets most similar to the earth probably receiving earliest attention--earlier attention, that is, than the other planets but still many years in the future.

In the category of unmanned experiments are the truly vast number of things to be done. If one but stops for a minute to recognize the uncertainties in our knowledge of even that portion of the earth's atmosphere which lies below forty thousand feet today, and the much greater uncertainties concerning our measurements of physical phenomena in the atmosphere above forty thousand feet, some grasp can be had of the tasks before us in measuring and understanding just the physical nature of space between the earth and our moon, for example. Much of this knowledge is essential to our utilization of this space as a medium of transit. It is also essential if we are to use any of the physical phenomena to our own purposes, and it is even more essential that we assure ourselves of reducing to a minimum the possibility of technological surprise through some discovery by an unfriendly nation that we ourselves do not understand. Many of the explorations to be made are essential to practical applications of space vehicles. We have all heard with varying degrees of enthusiasm of the use of communications, navigation, and meteorological services provided by satellite systems that are optimized to the particular adaptation in space. Television and radio reception in our homes of events as they take place anywhere in the world is indeed a very attractive prospect to think of. It is even possible that with such a communication prospect, many of the international problems in today's world could be greatly alleviated. I cannot resist at this point mentioning a personal experience which I have recently enjoyed. Three weeks ago today I was in Moscow, and like every other American visiting the USSR, I could not resist attempting my individual analysis of the Russian people and what it is about them that seems to make our two social systems so incompatible. The obvious and immediate answer one comes to, of course, is that the Russian system just does not recognize individuality, and the lack of respect for an individual's rights comes as somewhat of a shock even though one knows that it should be expected. The thing that was more surprising to me, however, was that in spite of this subjugation of the person to the welfare of the state, the average Russian in the street repeatedly demonstrates one outstanding trait--he is fiercely proud of his homeland. He just doesn't believe that any criticism is warranted and will defend with every means at his command his belief that the USSR as a geographical place and as a social system is the best in the world. As I said, this comes as a shock to the visitor when he is personally experiencing the comparison in standards of living. With just a little thought, however, it is not difficult to understand the source of this national pride. In the first place, regardless of the individual privations endured today, repeat visitors to Russia will assure you that the man in the street is in much better circumstances today than he was five or ten years ago. It is of relatively little importance that the standard of living in the free world may have improved by a like amount in the same period of time. In Russia it has been a case of adding to necessities, where most of us would agree that many of the recent improvements in our standard of living could hardly be so classified.

By far, a more important reason for the high esteem in which the Russian holds his homeland, however, lies in the area of communications. By newspaper, books, radio, television where it exists, and by all public speakers, the average Russian hears the virtues of the homeland extolled in a never-ceasing flow of carefully controlled information. With such mental pampering it is little wonder that the attitudes of the populace are remarkably consistent. In carrying out national programs, incidentally, this is a resource which can be put to work in the creation of remarkable short-time accomplishments. You can see that it accrues, however, only at a price which none of us would be willing to pay. The obvious question is raised, however,--Since the USSR pioneered in space exploration, will they not also be eager to enjoy the fruits of space conquest? And should a practical worldwide communications system result, may this not be a route to the minds of people throughout the world, with resultant promotion of understanding and compatibility between nationalities?

In addition to the practical applications of space vehicles, there is of course the ever-continuing program of scientific exploration simply for the purpose of satisfying man's curiosity and promoting a better understanding of the universe in which we live. The net result of such experimentation frequently leads, in turn, to practical application, but we cannot depend upon it as a motivating force lest we suffer from the shortsightedness of our ignorance.

To accomplish all or any significant part of the objectives I have suggested--and I have mentioned only a few of the more obvious possibilities--will require a comprehensive program entailing much work and a large expenditure of our national wealth. I don't doubt for an instant that we do have the will and the capability to dedicate ourselves to this task. But carrying it out will require a large measure of public understanding, patience, and determination. At the present time we are deeply engaged in improving the tools with which we will work. New space vehicles, propulsion systems, and guidance devices are being developed and integrated such that payloads of necessary size and weight may be delivered to positions in space with appropriate conditions of velocity and direction. These developments will take time and in the interim we are making such explorations as is possible with hardware that is available. Our space effort is still in its initial phases. We are just beginning to grasp the magnitude of the problems to be solved. Many of the possible benefits to be derived have been identified and we dare not neglect a program which might have an important influence on our relative position amongst the world community of nations. The rate at which it is carried out, however, must remain in the final analysis a decision of our democratic system. We in the NASA will endeavor to provide the leadership. It is the duty of every American and especially those of you who are knowledgeable in the technology of space to promote the education of the American public in these matters in order that we can have an intelligent and informed national determination.

- END -

NASA Release No. 59-163

FOR RELEASE: 12:00 Noon
Thursday, June 18, 1959

Address by T. Keith Glennan

Administrator

National Aeronautics and Space Administration

Dedication, Republic Steel Corporation Research Center

Independence, Ohio, June 18, 1959

As I stand in this new Republic Research Center -- a monument to our good friend, Charlie White -- I have feelings somewhat akin to those I had early last December when I watched a rocket-powered space probe take off toward the Moon from Cape Canaveral.

Both the rocket, lifting skyward on its fiery exhaust, and this great Research Center are, in their different ways, concepts to gladden the heart of anyone having to do with science and technology. I have been thinking, however, less about the immediate accomplishment the Center represents than of the future benefits for all mankind it will help to make possible.

This Center is a symbol of a new dimension in thinking -- as much so as the rocket vehicles that are just beginning to reconnoiter the frontiers of outer space. Both are part and parcel of the dawning age of Scientific Unity, of which the Atomic Age and the Space Age are subdivisions.

Whatever we term this era, one thing is certain: it is making large demands on all the scientific disciplines involved in the field of research in materials. These demands will increase enormously in volume and scope in the years ahead. They are increasing rapidly today. And to meet the demands, very many complicated and interlocking problems will have to be solved by research — both basic and applied.

Man has undergone numerous explosive technological revolutions, most of them associated in some way with new materials or improved methods of fabricating old materials. Some 8,000 years ago he mastered the arts of agriculture and copper-smelting in a relatively brief period, from a historical point of view.

Four thousand years later, man had begun using bronze implements and the wheel, and had devised several systems of writing. About 1,000 B.C., he ushered in the Iron Age, replacing bronze tools and weapons with this vastly superior and more abundant material. Upon this 3,000-year-old iron base, our modern technology has been built.

Iron and its products predominated until about 1900. At that time, only copper, tin, zinc, lead, gold, and silver had been employed to any appreciable extent for fashioning useful articles. Today, at least 30 additional metals are in commercial use and another 35 to 40 are in the development stage as possible substitutes either for dwindling supplies of the older metals or for new applications which the older metals cannot meet.

Titanium is a very good example of our fast pace in the development and application of new metals and alloys. Little more than 10 years ago, this versatile and abundant element was almost unknown outside the laboratory. Today it has taken its place among those standard materials which the designers of aircraft, missiles, space vehicles, and chemical products must consider when they begin work on new concepts. The Republic Steel Corporation, we know, made very important contributions to the research and development that so rapidly advanced the technology of titanium-based alloys.

Much of this increased pace in discovery and application can be traced directly to the insatiable demand of our armed services for new weapons systems which then have given rise to new industries such as those we find in the electronic and nuclear fields. To satisfy this demand and better to serve the other needs of the nation, industry and government have been spending ever-increasing billions in research. In recent years, industry has ceased to concentrate primarily on applied research, and is pouring more of its capital into basic research. It has found that basic research has a way of paying off in the long run.

During the past decade, manufacturers of steel and other metals have begun studying the basic chemistry and physics of solids, to improve their strength and to create forms not met with in nature. Physicists, performing research in the solid state, began to calculate the tensile strengths of materials from their atomic structures. It was found that many had theoretical strengths ranging from 20 to 100 times the actual resistance achieved by any known fabrication method.

To cite an example with which many of you are familiar, it has been discovered that the inherent strength of pure iron rests in microscopic fibers called "whiskers." These filaments are perfect crystals. Their tensile strength reaches 2,000,000 pounds per square inch, more than 40 times the strength of cast iron bars, and more than seven times the strength of the finest steel produced today. The assumption is that the lesser strength of metal bars and sheets is due to imperfect links in these crystals. An important job awaiting research centers such as this one is to learn how supermetals and superalloys can be built from these filaments.

Actually, it is my conviction that the time has come to change our concept of the metallurgical industries. Instead of thinking in terms of the steel industry, or the aluminum industry, we should consider them all together as interlocking segments of one dynamic materials industry. Only thus can the vast potential of industry in creative technology serve the varied needs of advanced design.

Let us review briefly some of the developments that have taken place in recent years in the fields of metallurgy and special materials for use in atomic energy and for application to aeronautical and space work.

Many metals and materials employed in nuclear energy differ little from those common in other lines of industry and science. But others have been, and are being, developed specifically to meet nuclear requirements. It is pertinent to note that reactor fuels are themselves metals -- uranium and plutonium. In several reactor types, coolants may be liquid metals such as sodium or sodium potassium.

By and large, atomic energy projects require metals that can meet extraordinarily stringent specifications of purity and strength that would seem fantastic elsewhere. Violently corrosive chemicals and molten metals come into contact with some of these materials, and the materials must stand up. Other metals are subjected to terrific heat stresses and to continuous bombardment by fast neutrons and other atomic radiations.

Under all these extremely difficult conditions, materials and devices for nuclear power plants must work ultra-reliably over long periods with a minimum of human attention. In meeting such unprecedented requirements, scientists and production engineers have pioneered a unique metallurgy. Several rare metals that were laboratory curiosities a few years back are now being produced for atomic utilization. Among them are beryllium, zirconium, boron, hafnium, and -- of course -- uranium itself. In the light of today's knowledge, it is somewhat shocking to note that before World War II, uranium, the metal vital to fission, was discarded as waste when radium and vanadium ores were processed.

Now, much is known about these metals. But much more remains to be investigated, explained, and applied. Moreover, to cope with present problems and those implicit in advanced concepts of nuclear energy, research must constantly seek both to develop better alloys of known metals and to discover new materials.

Space research and development, like that for atomic energy, has spurred us on to develop stronger, lighter, more heat-resistant materials. A rocket shooting out of the atmosphere into the near-vacuum of space, and back into the atmosphere, encounters great extremes of heat and cold. Upon re-entry, the rocket's exposed surfaces reach thousands of degrees Fahrenheit. The combustion chambers, where high-energy fuels are converted into thrust, reach even higher temperatures.

To date, stainless steel has proven to be the toughest material for rocket-powered aircraft and for rockets and missiles. The X-15 rocket-plane is made largely of Inconel-X, a nickel-based alloy, that will withstand temperatures up to 1,200 degrees Fahrenheit. The nose cone of the Jupiter-C missile, which launched our Explorer satellites, was made of stainless steel produced by Republic. And the skin of the powerful Atlas, which will fire our first manned satellite into space, is made of thin sheets of stainless steel.

In space research we can sometimes use a material under conditions that would ordinarily cause it to fail. Consider, for example, extremely high temperatures transferred by aerodynamic heating to the skin of a space vehicle. At more than 3,000 miles per hour, which we may attain with the X-15 research airplane, the skin temperature reaches 1,200 degrees

Fahrenheit, near the point of structural failure for nickel and the strongest steel available today.

But rockets are exposed to extremely elevated temperatures for only a few minutes during re-entry, so that heat does not build up to its maximum. We can't have sustained flight at these temperatures but we can approach such temperatures in short bursts of speed, repeated a number of times. Even so, the life of the structure is limited because the destructive effects of high temperatures are cumulative.

In the combustion chambers of present-day rockets, both temperatures and pressures are very great. Temperatures range up to 5,000 degrees Fahrenheit -- well beyond the melting points of readily available materials -- so we have had to evolve special techniques to be able to use combustion chambers built of these materials. One technique, termed regenerative cooling, passes the liquid propellants, as they come from the tanks at very low temperatures, through coils of tubing that comprise the walls of the chamber. Thus the propellants cool the sides of the chamber, on their way to the nozzle where combustion begins.

Even with these techniques, our most powerful rockets are subject to temperatures close to the limit of present materials. Until recently, these rockets have been considered expendable. Therefore, it was necessary for the structural materials to last only until the rocket separated from the rest of the vehicle after burnout.

Now the time is at hand when we must consider ways of recovering expensive boosters for re-use. Obviously, more durable materials must be found.

Indeed, we need stronger, heat-resistant materials for many purposes. With advanced chemical propellants -- for example, liquid hydrogen or fluorine -- we can achieve much greater thrust per pound of vehicle weight, with correspondingly higher temperatures. The strongest alloys we now employ are those based on cobalt and nickel, melting at about 2,700 degrees Fahrenheit. As I suggested earlier, there is the possibility of creating supermetals and superalloys, building them out of aggregations of crystal filaments. A ceramic material made up of pure beryllium oxide has withstood tests in the 4,600 degree Fahrenheit range, according to its manufacturer. Another ceramic, tested recently for rocket-nozzle throats, was little affected by one-minute bursts of rocket exhaust at 5,000 degrees Fahrenheit.

These examples highlight a few of the problems associated with the properties of materials in space operations. Many others will suggest themselves to the metallurgist, or to the specialist in solid physics. To a large extent, solutions will come from long-term research on the basic structures and behavior of metals and other materials, rather than from applied studies aiming at immediate uses.

That is why I was glad to learn that the Republic Steel Research Center will devote a major part of its budget to long-range and basic research. And as the years move on, I will be surprised if that portion of the Center's annual budget allotted to basic research does not increase materially.

It is desirable to recall, as we admire these splendid modern facilities, that a research laboratory, however well equipped, is only as good as its staff. The best facilities and the most elaborate scientific devices are merely tools to accommodate and extend the capabilities of good men. To use these tools effectively, it is necessary to have individuals well schooled in all the interdependent disciplines of science.

And to this combination of research tools and the men who use them, there must be added one more priceless ingredient -- leadership and direction. Republic is fortunate indeed in having men such as Earle Smith and Peter Robertson in active association with its research direction under the stimulating leadership of Tom Patton and Charlie White.

These men know the value of highly trained scientists and engineers. And this leads me to a more personal note -- one involving Case, Republic, and Charlie White. The ties between Republic and Case have been particularly close over the years I have been active head of that Institution. The Corporation was a founding member of the Case Associates, the group of fine companies that came together in 1948 to underwrite our operations as we moved into a broader approach to

to science, engineering, and education in this area, and particularly to Case Institute.

store of knowledge about materials while training well-qualified and able young graduate students.

We may be sure that these campus activities will be intimately associated with the Republic Research Center we are dedicating today. Together, they can make of Cleveland an international focal point for scientific and engineering studies in the field of materials.

With great personal pride, then, I join the members of this fine audience in saluting Republic Steel and its officers as the Corporation steps out onto new and more important avenues of service to industry and the nation. May the future bring to all those who will carry on the research effort within these walls the satisfactions that always accompany the finding of new knowledge and the application of that knowledge to the betterment of mankind.

- END -

NASA Release No. 59-165

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION

WASHINGTON 25, D. C.

June 19, 1959

NOTE TO EDITORS:

Facilities of the NASA Space Task Group and headquarters of the Project Mercury Astronauts will be open to the press on Tuesday, July 7, at the NASA Langley (Virginia) Research Center. The tour will get under way at Space Task Group Headquarters at 9 a.m. -- Eastern STANDARD Time -- and will conclude by 4 p.m.

The tour will be in the nature of a progress report -- no earth-shaking pronouncements are anticipated in this early phase of the program.

Briefly, we plan discussions by scientific and medical specialists, a look at the astronauts at work, and a Q & A conference with the astronauts.

NASA has no airlift facilities. If you wish to join us at Langley, you must make your own travel arrangements. National and Capital Airlines have frequent service into Patrick Henry and Norfolk Municipal Airports, and Langley (located in Hampton) is accessible by the Chesapeake and Ohio Railroad and Greyhound and Trailways bus lines. Best auto routes are via Rts. 17, 60 and 258.

A dutch-treat luncheon will be held in mid-day.

So that on-base transportation and luncheon arrangements can be made, it is necessary that we hear from you by July 2 regarding your intention to make the tour.

Herb Rosen
Deputy Director
Office of Public Information

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION

WASHINGTON 25, D.C.

Hold for Release
Until Launched

No. 1
6/22/59

EXPERIMENT DETAILS

In this experiment scientists are trying to get measurements of the solar-earth heating process which causes our weather.

Tiny electronic thermometers on the tips of four antennas projecting from the 22.5-pound spherical satellite are to record the intensity of:

1. Direct sunlight.
2. Sunlight reflected principally by the earth's cloud cover and snow.
3. Heat emitted by the earth.

Readings on those items add up to one of meteorology's major unknowns. Getting the measurements won't mean rewriting all the meteorology books overnight. But they will represent a fundamental research step toward a better long-range weather forecasting program in which satellites are to play an important part.

"Satellites will be as important to meteorologists as microscopes are to bacteriologists," says University of Wisconsin Meteorology Prof. Verner E. Suomi (rhymes with Sue Me), who devised the experiment and headed a university team which built it to NASA specifications.

Meteorologists agree generally on the dynamics of the heat transfer mechanism which produces weather: The sun, acting as a gigantic fireplace, throws out heat and light which strike the earth. The equator gets more solar energy than any place else on earth because the sun's energy hits it at a right angle -- concentrating it -- while the sun's heat and light hit the polar regions a glancing blow over a wide area. The equator absorbs more energy than it loses and, conversely, the poles lose more than they absorb.

Since the earth's average temperature doesn't vary too widely, heat, caught up in the atmosphere, must move from the equator toward the poles. As the air masses move over water, they pick up moisture, forming clouds. The spin of the earth (about 900 mph) helps move them. It all adds up to weather, the meteorologists agree.

However, there is wide disagreement among the experts on the size of the heat input at the lower latitudes and the heat loss at the higher latitudes.

If successful, Vanguard III may go a long way toward settling that argument because it will be moving in a nominal 50-degree orbit -- 50 degrees north and south of the equator.

But the answer won't be easy to come by. Each orbit will pick up some 14,000 bits of information in a 10-digit code. With about 12 orbits a day through the 80-day life of the transmitter batteries, the instruments should produce more than 13 million meaningful numbers. Even with the aid of high-speed computers, it will take months for Dr. Suomi and a team of Wisconsin students to analyze the data.

The satellite instrumentation itself appears deceptively simple.

Small spheres -- two about the size of golf balls, the other two about the size of marbles -- ride on the tips of the four antennas, each 25 inches long and spaced at 90-degree intervals about the satellite's equator.

The spheres or sensors are coated and shielded to act electronically depending on the amount of energy they "see" or feel. The electronic response differs because direct sunlight, earth-reflected light and earth-emitted heat have different spectral characteristics.

One of the two marble-sized spheres is mounted in what appears to be an open-ended tin can. The other is shielded on two sides by discs. When the can-like sensor is "looking at" direct sunlight, the other will "see" the earth's reflected light.

The two golf-ball-sized sensors are coated, one white and the other almost black. The white one is sensitive to earth-emitted heat; the black one to all three kinds of heat and light the satellite is measuring.

Inside each sphere is an electronic thermometer -- no bigger than a speck of dust -- which the technicians call a thermistor. The thermistor, made of metal oxides, is sensitive to the temperature of the sphere and allows electricity to pass through it accordingly -- the higher the temperature, the more electricity gets through.

The varying amounts of current passing through the thermistor move down a wire through the hollow antennas to an electronic counter in the satellite. The counter, rigged to a timer, changes the electric impulse into a digit and stores it on a six-foot-long magnetic tape.

On command from the ground once per orbit, a tiny tape recorder "plays back" 120 minutes of information in five to ten seconds.

The tape recorder itself weighs less than a pound. Two transmitters, one for tracking operating at 10 milliwatts and the other for telemetry at 80 milliwatts, and other electronics plus batteries weigh 12 pounds.

The magnesium alloy satellite shell, laminated and riveted together in four sections, brings the total satellite weight to 22.5 pounds.

The transmitter power supply should last about 80 days while the tracking batteries are programmed to run about 110 days. There are no solar batteries aboard.

The satellite will be tracked and interrogated by 12 NASA minitrack stations. They are located at Blossom Point, Maryland; Fort Stewart, Georgia; Havanna, Cuba; Satiago, Chile; Antafagasta, Chile; Lima, Peru; Quito, Ecuador; Grand Turk Isle, Bahamas; San Diego, California; Esselen Park, South Africa, and Woomera, Australia. In addition, the satellite will be interrogated by a station set up for this experiment at the University of Wisconsin (Madison). The payload will be interrogated by a designated station closest to the satellite at the time.

The tracking signal will be a steady tone at 108.00 megacycles. The satellite will be interrogated on 108.03 megacycles.

The satellite also will be tracked photographically by precision camera teams of Smithsonian Astrophysical Observatory, Cambridge, Mass., under contract to NASA. Camera stations are located at Organ Pass, New Mexico; Olifantsfontein, South Africa; Woomera, Australia; Cadiz, Spain; Tokyo, Japan; Nani-tal, India; Arequipa, Peru; Shiraz, Iran; Curacao, B. W. I.; Hobe Sound, Florida; Villa Dolores, Argentina and Haleakala, Hawaii.

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION

WASHINGTON 25, D.C.

No. 4
6/22/59

BACKGROUND ON DR. SUOMI

Dr. Verner E. Suomi, who devised the Vanguard III experiment to measure the heat budget of the earth, wrote his doctoral thesis on the heat budget of a cornfield.

"Now we are taking a look at the forest, instead of a single tree," says the soft-spoken 44-year-old University of Wisconsin meteorology professor.

"We are trying to make a kind of meteorological yard-stick," explains Dr. Suomi (it rhymes with Sue Me). But he underscores the fact that the experiment represents a step in fundamental weather research.

Of Finnish extraction -- his name means Finland -- Dr. Suomi was born in Eveleth, Minn. He studied engineering at Winona (Minn.) State Teachers College and later studied and taught meteorology at the University of Chicago from 1943 to 1947. In 1948, he began teaching at the University of Wisconsin. He received his doctorate from the University of Chicago in 1953.

He claims small credit for the satellite. "I went to the University College of Engineering with a tentative design. They took it from there and made it work," he says.

Specifically, he credits fellow Wisconsin professor Robert J. Parent with solving a number of the experiment's electronic problems, Wisconsin graduate student Charles Stearns who designed the discriminating sensor spheres and a host of others at Madison and NASA. The satellite itself was assembled by a NASA Goddard Space Flight Center team headed by Project Officer Frank Martin. Curt Stout of the same group built the radio transmitters and receiver.

Meanwhile Dr. Suomi's space activities haven't meant that he has abandoned his first love, the cornfield. With another Wisconsin colleague, he is writing five pamphlets on Wisconsin's agricultural climate for farmers. Also he is doing some water research -- measuring currents at great depths, water evaporation and how plants use heat and water.

When he is not teaching or engaged in space, cornfield or water research, Dr. Suomi and his wife, Paula, with their three children -- Lois, 15, Stephen, 13, and Eric, 9 -- enjoy camping-fishing trips in Wisconsin. They live at 10 Rosewood Circle, Madison.

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION

WASHINGTON 25, D. C.

NASA RELEASE NO. 59-167
EX 3-3260
Ext. 7807

FOR RELEASE:
Thursday, p.m.'s
June 25, 1959

CONTRACT APPEALS BOARD NAMED

NASA Administrator T. Keith Glennan today appointed a three-man Contract Appeals Board with final authority in settling disputes arising from NASA contracts.

Board chairman is Paul G. Dembling, assistant general counsel of NASA. Other members are Robert Nunn and Ray Harris, both attorneys with the NASA Office of the General Counsel.

At the same time, the agency released a 24-point document spelling out contract appeal procedures. The instructions supersede appeal procedures established under the old NACA General Instructions No. 6, November 14, 1955.

While procedures are generally similar to those used by other Government departments and agencies, several new features have been incorporated to expedite handling of cases.

For one, the time period for the Government to file papers before the board has been shortened. Also, appeal files will be available for inspection at the field office of the contracting officer as well as at the appeal board office (NASA headquarters).

Copies of the appeal instructions may be had by writing Paul G. Dembling, Chairman, NASA Board of Contract Appeals, National Aeronautics and Space Administration, 1520 H Street, N. W., Washington 25, D. C.

- END -

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION

WASHINGTON 25, D. C.

Hold for Release
Until Launched

No. 2
6/22/59

VANGUARD SATELLITE LAUNCHING VEHICLE 6

While this launching vehicle is the same used in past Vanguard experiments, a new payload separation technique will be employed: Payload and third stage will part on ground signal command as they cross the United States at the end of the first orbit.

The launching vehicle itself is approximately 72 feet long, 45 inches in diameter at its base, finless, with a gross take-off (loaded) weight of 22,600 pounds. The Martin Co. is prime contractor for the vehicle.

The liquid-propellant first stage has a gimballed engine built by General Electric Co. Its propellants are liquid oxygen and kerosene.

The second stage also is a liquid-propellant rocket, burning white fuming nitric acid and unsymmetrical dimethylhydrazine. Its gimballed engine and fuel tanks are made by Aerojet-General Corp.

The second stage contains the "brains" of the entire launching vehicle -- the guidance system. Minneapolis-Honeywell Regulator Co., Air Associates, Designers for Industry and the Martin Co. provide the vehicle's guidance and control system. Also in the second stage is a spinning mechanism for the third stage.

At the end of a 280-second coasting period after second-stage burnout, the vehicle should be in the proper angle or "attitude" to put the third stage and payload in an orbital path.

The third stage is a solid-propellant rocket, consisting of a cylindrical case, nozzle, propellant charge and igniter. Grand Central Rocket Company made the third stage engine in SLV 6.

The first stage burns for 144 seconds. Second stage ignition occurs within a split second of first-stage separation. During second-stage burning, a plastic nose cone enshrouding the payload pops off at plus 172 seconds. Second stage burns out at plus 261 seconds.

Then comes a 280-second coasting period. During this period, third-stage spin-up starts at plus 527.5 seconds. The third stage ignites at plus 541.5 seconds and burns out at 571.5 seconds. A two-hour coasting period follows during the initial orbit before the third stage and payload separate.

Dr. Verner E. Suomi headed a group at the University of Wisconsin which devised this experiment to measure the earth's heat balance. The payload was built to NASA specifications.

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION

WASHINGTON 25, D. C.

Release No.
59-170

For Release
THURSDAY
June 25, 1959

SIX-STAGE ROCKETS LAUNCHED AT WALLOPS ISLAND

A research program using six-stage rockets to study basic phenomena of re-entry physics is being jointly conducted by the National Aeronautics and Space Administration and the Advanced Research Projects Agency at NASA's Space Flight Station, Wallops Island, Virginia.

The six-stage vehicle firings are part of a broad study of the physical conditions which occur when a body re-enters the atmosphere. The first three stages carry the vehicle to a peak altitude of about 200 miles. After a coasting period the vehicle is propelled earthward at speeds up to Mach 22 (about 16,000 mph).

The vehicle consists of Honest John, Nike, and Lance boosters as initial stages. A single airframe houses the last stages: Thiokol T-40 and T-55 rocket motors, and a spherical rocket motor.

The spherical motor, five inches in diameter, was designed, developed and built at NASA's Langley Research Center.

In tests to date, vast speeds generated on the downward leg have given the payload the appearance of a flaming meteor. Before the final stage is consumed from atmospheric friction, scientists have been able to obtain considerable tracking data from optical devices, radar and telemetry.

Tracking is conducted optically at Wallops, Coquina Beach, North Carolina, and by a NASA aircraft stationed in the re-entry area about 50 miles from the launching site. Radar tracking is conducted by the Lincoln Laboratory at Millstone Hill, Massachusetts, and at Wallops. Doppler telemetry receivers are at Wallops; Langley Field, Virginia; Cape Hatteras and Edenton, North Carolina.

Use of six stages in this re-entry physics program is the first time this number of stages has been launched in U. S. research programs. Langley Research Center's Pilotless Aircraft Research Division has launched a number of five-stage research rockets from Wallops Station in programs to study aerodynamic heating and ballistic missile re-entry problems.

Established in 1945 to obtain data at transonic and low supersonic speeds, Wallops Station now is used almost exclusively in the study of hypersonic and space flight problems.

Thus far, more than 3,000 models have been launched by rockets from Wallops. More than 100 multi-stage research models are fired there every year.

- END -

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION

WASHINGTON 25, D. C.

Release No. 59-172
EX 3-3260
Ext 6325

FOR RELEASE
Tuesday A. M.'s
June 23, 1959

NASA MAY CONTRACTS TOTAL $21 MILLION

The National Aeronautics and Space Administration awarded approximately $21 million in contracts during May, including three of more than a million dollars.

Largest single award went to Convair Astronautics Division of General Dynamics, Inc. This firm was given a $7.5 million contract as initial funding for eight two-stage Vega boosters, plus an additional Vega for captive firing tests. (See NASA Release 59-131, May 6, 1959.)

NASA's Jet Propulsion Laboratory received $5 million as initial funding for technical supervision of the Vega project, planning Vega interplanetary missions, and for providing a third stage for Vega.

The Air Force Research and Development Command's Ballistic Missile Division received from NASA an additional $4.4 million for already authorized space probes. With approximately $16 million previously obligated to BMD from NASA, the additional funds will be used toward the firing of Thor-Able and Atlas-Able vehicles.

The Air Force has contracted to the Space Technology Laboratories of Los Angeles responsibility for payload assembly, which will be accomplished under NASA supervision.

Thor-Able is a standard Thor intermediate range booster with two Vanguard stages on top. Atlas-Able is a standard Atlas intercontinental range booster topped with Vanguard upper stages.

Other NASA contracts negotiated last month include:

NASA's Jet Propulsion Laboratory -- $110,000 -- for a transmitter to be installed in JPL's Goldstone, Calif., tracking installation as a part of NASA's passive communications satellite project. The project calls for an orbiting 100-foot inflatable plastic sphere off which radio signals would be bounced cross-country within the next year.

Bureau of Ordnance (Navy) -- $180,000 -- for 16 third-stage Delta rocket motors, 12 of which would be used in the Delta launching vehicle. (See NASA Release No. 59-124, April 29, 1959). The remaining four would be mounted on Sergeant rockets for high-altitude firings from NASA's Wallops Space Flight Station (Va.) to check out sphere ejection and inflation.

Office of Army Surgeon General -- $150,000 -- For Medical aspects for the successful Jupiter shot last month in which monkeys Able and Baker were sent 300 miles up in space and recovered safely.

Army Ballistic Missile Agency -- $1 million -- For advanced research into four areas: 1 - Propulsion and propellants; 2 - Guidance studies involving celestial mechanics of trajectories in lunar and interplanetary missions; 3 - Investigation of thermal properties of materials in space re-entry research and 4 - Effects of space environment on physical and chemical properties.

National Academy of Sciences -- $350,000 -- To finance research associateship program by providing study grants at the graduate and post-doctorate levels. The research associates selected by the National Academy of Sciences will conduct their studies in the Goddard Space Flight Center.

National Science Foundation -- $110,000 -- In support of the Space Science Board of the National Academy of Sciences, which advises NASA on its space sciences program objectives.

Yale University -- $110,000 -- To finance the use of a radio telescope to measure the doppler effect of the 21 centimeter hydrogen line resulting from the orbit of the earth around the sun. This will permit re-determination of the astronomical unit (mean distance of the earth from the sun).

University of Florida -- $60,000 -- Study of general instability of cylindrical shells, aimed at aiding both rocket and space vehicle designers.

California Institute of Technology -- $110,000 -- Basic studies of cylindrical and conical shells.

New York University - $120,000 -- Study of general instability of stiffened circular cylinders.

Army Ordnance -- $50,000 -- For part of 20 Nike Asp sounding rockets to be fired from Fort Churchill, Canada, and Wallops Space Flight Station in ionospheric sampling experiments. The vehicle can carry 50-pound payloads to an altitude of 150 miles.

Aerojet General Corp. -- $660,000 -- For 20 sounding rockets (Aerobee Junior and Aerobee-Hi vehicles) which can send 150 pounds to 150 miles in ionospheric investigations, to be fired from both Fort Churchill and Wallops.

Army Ordnance Missile Command -- $560,000 -- For multi-frequency radio beacons to be used in earth satellites investigations of the ionsophere.

University of Wisconsin -- $60,000 -- Design studies for an ultraviolet telescope system to go into a future orbiting space observatory. The telescope would examine the radiation emitted by stars.

JPL -- $300,000 -- Research and development on improved tracking and receiving equipment for deep space missions.

Massachusetts Institute of Technology -- $200,000 -- To assist NASA in making technical evaluations of facilities and instrumentation in tracking network for Project Mercury, the manned space flight program.

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NATIONAL AERONAUTICS AND SPACE ADMINISTRATION

WASHINGTON 25, D. C.

NASA RELEASE NO. 59-175

FOR RELEASE:
Saturday AM's
June 27, 1959

Faulty Regulator Blamed in Vanguard Launch

The Vanguard launched June 22 failed because of a faulty second-stage pressure valve, NASA officials said today.

A regulator, designed to control helium flow which drives second-stage propellants into the engine, did not operate on radio command. Pressure then built up within the helium reservoir which ruptured about 40 seconds after second-stage ignition.

Without sufficient pressure on the propellants, the second-stage engine ran roughly. The helium tank burst when the vehicle was about 40 to 50 miles high.

The rocket arced over in a ballistic trajectory when about 90 miles high. Telemetry records show the third-stage engine ignited before plunging into the Atlantic Ocean some 300 miles north-east of the Atlantic Missile Range, Cape Canveral, Fla.

Tracking stations had contact with the rocket for more than seven minutes after launch. The space experiment was designed to measure the heat balance of the earth.

The regulator that failed is the same type which has been used in scores of rocket launchings. Project officials said this was the first time they could recall one of them had failed.

- END -